Instruction manual for Melting point meters MPM

General information:

The covering hood should be drawn over only once the instrument cooled down.
Capillary must be inserted with the open end up!

Unpack the instrument carefully. The instrument should adapt to room temperature before setup. It is important that any damage incurred in transport be recognised at the time of unpacking. Notify your carrier or forwarding agent immediately in case of such damage.
Read the instruction manual carefully before operating the instrument. Should there be any additional questions regarding the setup, operation or warranty after reading this instruction, please contact either your distributor or the manufacturer at the following address:

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Germany

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Technical data:

Electric mains:	90-264 V / AV
Heating:	12 V / DC 25 W
Safety class:	IP 20
Temperature range:	30-360 °C
Accuracy:	bis 200 °C: ± 0,4 °C / 200 bis 360 °C: ± 0,5 °C
Reproducibility:	± 0,3 °C
Capillaries:	Marienfeld Cat. No. 29 402 11 one end closed, 80 mm length, 1.4 mm outside diameter, 1.0 mm inside diameter

Safety instructions:

- Use only capillaries with one end closed and 1.4 mm outside diameter
- Do not cover the ventilation slots
- Do not insert any objects into the ventilation slots
- No humidity may intrude into the instrument
- During analysing the melting point, the measuring head heats up extremely near the ventilation slots. Do not touch the measuring head. The integrated oven can reach temperatures up to 400 °C. **Risk of burns!**
- Please follow the general safety regulations when working with chemicals
- For maintenance works e.g. changing the fuse or cleaning the instrument with a dry or a slightly moistened cloth, always make sure that the instrument is disconnected from electricity
- Only authorized personnel or manufacturer may carry out servicing and maintenance

Setup:

The instrument is constructed for determination of the melting point of powdery substances up to 360 °C.

- Choose a suitable place for the instrument. Avoid direct sunlight and the immediate vicinity of heating devices.
- Connect the instrument to the power supply (alternating current). Before starting the first measurement, the instrument should be switched on for about 15 minutes to reach the optimal working temperature.
- Up to 3 samples can be tested at the same time in ascending temperature-sequence.
- The instrument switches off heating automatically (time-out) after approx. 5 minutes if no further measurement is made.
- Please note that melting point results can differ compared to other devices due to measuring tolerances.
- We recommend calibrating the instrument every two years.

Operation of Melting point meter MPM-H2

Determination of the melting point

- Switch on instrument at the reverse side
- The display now shows the oven temperature.
- Adjust starting temperature (approx. 3 °C less than the expected melting point) with the **up**- and **down**-button
- Press **start** button
- An alarm sounds three times as soon as the start temperature is reached.
- Insert the capillary (filling approx. 4 mm) with the **opening at top.**
- Press **start** again. The temperature increases now with a rate of 1 °C/minute.
- Observe the sample in the magnifying glass and press **stop** when as soon as the melting point is reached. The melting point now will be stored and displayed.
- The instrument cools down again. When the alarm sounds again, the instrument reached the start temperature again and is ready for the next measuring.

Operation of Melting point meter MPM-HV2

Setting date and time for printer operation

- Press the button ***time set***
- The display is showing the setting menu, the cursor is flashing
- Each time you press **time set**, the cursor will jump to the next input value.
- Pressing the **up**- or **down-**button, the value can be changed.
- When setting the date, the first value is the year followed by the month, the day and the abbreviation of the day
- Hours and minutes have to be set separately
- After having completed the setting of date and time, please leave the menu by pressing the **print** button. The settings will be stored and remain in store for 1 year without mains connection.

Determination of the melting point

- Switch on instrument at the reverse side
- The display now shows the oven temperature and a signal tone sounds
- Adjust starting temperature (approx. 3 °C less than the expected melting point) with the **up**- and **down**-button
- Press **start** button
- An alarm sounds three times as soon as the start temperature is reached.
- For the following procedure you have to decide whether measuring should be done visually or fully automatically.

1. Visual measurement

- Insert the capillary (filling approx. 4 mm) with the **opening at top in channel 2.**
- Press **start** button. The temperature increases with a rate of 1 °C/minute.
- Observe the sample in the magnifying glass and press the **print** button as soon as the melting point is reached. The temperature will be stored and displayed.
- On pressing again the **print** button, the melting point temperature is printed.
- The instrument cools down again. When the alarm sounds again, the instrument reached the start temperature again and is ready for the next measuring.

2. Fully automatic measuring

- Insert the capillary (filling approx. 4 mm) carefully with the **opening at top in channel 1** of the guiding head until the capillary touches perceptibly.
- Now the instrument starts heating. The temperature increases with a rate of 1 °C/minute. As soon as the melting point is reached it is printed automatically.
- During cooling down to the start temperature, the display shows "**waiting**".
- As soon as the message disappears, the same measuring can be done again.
- The instrument automatically cools down (cooling fan) to 30 °C if no further measuring is carried out within the next 5 minutes.
- Do not switch off the instrument before reaching 30 °C because this will switch off the cooling fan as well.

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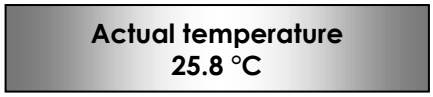
Procedure / User manual

1. Initial display



This display is shown after switching on the instrument.
As soon as the temperature exceeds 35 °C, the fan will start automatically. The fan will switch off automatically as soon as the temperature is less than 30 °C.

Continue with point 2 after having pressed either the **up-** or the **down-button**

2. Selection of the target temperature

The temperature adjustment is effected in steps of 1 °C.

The menu can be closed by switching off and on the instrument or by time-out.
A time-out occurs after 5 minutes without pressing any button. The instrument will be restarted (see point 1).

When starting the selection of the target temperature, the fan is switched off automatically.

If the target temperature exceeds the actual temperature of the oven, inserting the capillary witll start the regular procedure of the melting point determination.

If the target temperature is less than the actual temperature of the oven, an error message will be displayed for approx. 3 seconds in case that the capillary is already inserted:

After this error message, the display gets back to the initial display, the procedure is interrupted. The fan is switched-on automatically.
The last selected temperature is deleted only when switching off the instrument.

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3. Starting the determination of the melting point (fully automatically)

a) In principle

The determination of the melting point is started only after inserting a filled capillary in the oven and in case that beforehand a target temperature has been selected and the instrument reached the target temperature.

The procedure is not started if a capilly is not filled correctly. Coarse grained substances should be ground to smooth powder. Before starting the melting point determination, the light transmission is shown in the display. The smaller the percentage (should be less than 2 %), the better the filling.

In case a capillary has been inserted before selection of the target temperature, you have to remove the capillary. The display shows:

Take out capillary

After having removed the capillary, the display skips automatically to the menu for the selection of the target temperature.

The last selected temperature remains in memory until the instrument is switched off.
The last determined melting point remains in memory until the instrument is switched off or a new measurement is started.

b) Express heating

express heating temp. 78.8 °C

The express heating starts by pressing the start button after having selected the target temperature. The current temperature is shown and refreshed every second.

The heating slows down when a temperature of approx. 3 °C below the selected temperature is reached. Once the selected temperature is reached, an alarm sounds for approx. seconds.

The express heating can be terminated by pressing the up- or down-button. Pressing one of these buttons will start point 2 again (selection of the target temperature). The fan will not be switched on. The print button has no function at this moment.

c) Slow heating

1 °C/min. -> 2 % Temp. 121.3 °C

Slow heating is effected with approx. 1 °C/minute. This procedure is started automatically by inserting a filled capillary after having selected the target temperature. The melting process is displayed in °C and in % from the beginning of the melting until reaching the melting point.

The target temperature is displayed.

In case that the melting point is not reached within the next 10 minutes, the slow heating is interrupted by time-out and an internal error-code will be logged as melting point.

The procedure can be interrupted at any time by pressing the up- or down-button. The instrument skips automatically to point 2 (selection of the target temperature). The fan will not be switched on. The print button has no function at this moment.

d) Reaching the melting point

Melting point 121.9 °C auto

As soon as the melting point is reached, an alarm sounds three times for approx. 0.5 seconds.

The corresponding temperature will be shown on the display now. The instrument automatically cools down to the selected target temperature. During this time the display is shows "auto" flashing in the lower corner at the right side.

As soon as the selected target temperature is reached again, the alarm sounds once again for 0.5 seconds and "auto" is shown in the display without flashing.

In case a capillary is inserted while "auto" keeps flashing, there will be an error-message on the display. Immediately on reaching the selected target temperature, the next measuring process will start.

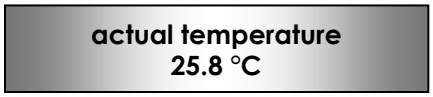
The measuring process will be repeated in case that a new capillary is inserted within 5 minutes.

If the up- or down-button is pressed within 5 minutes, the instrument returns to point 2 (selecting the target temperature). The fan will not be switched on.

When pressing the print button (MPM-HV2) within 5 minutes, the result will be printed. Printing can be repeated as often as required.

After 5 minutes without pressing any button, there will be a time-out and the instrument returns automatically to point 1 (initial display and cooling fan etc.). The lastly measured melting point will remain stored and can be recalled at any time by pressing the print button (MPM-HV2) resp. the stop-button (MPM-H2).

e) Recall of the lastly measured melting point



In case that you missed reading the melting point on the display and the instrument already returned to the initial display the lastly measured melting point by pressing the print button (MPM-HV2) resp. the stop-button (MPM-H2).

The melting point is shown for approx. 5 seconds. Thereafter the instrument returns to the initial display. If the print button is pressed within 5 seconds again, the melting point will be printed (MPM-HV2). This process can be repeated as often as required.

At this time "auto" will not be shown because measuring a melting point cannot be started. Inserting a capillary does not have any effect.

For the following reasons there could be an error message instead of a melting point temperature:

- The melting point measuring was interrupted by pressing the up- or down-button. The following message is shown for 5 seconds:

- The melting point could not be measured due to a time-out (10 minutes). This means the melting point could be 10 °C higher than the selected start temperature. The display is showing the error message for 5 seconds.

4. Setting of date, time and language

After having pressed the button ***time set*** next to the display, the set-up menu is shown:

A flashing cursor is shown in the display. With every push of the ***time set*** button, the cursor skips to the next value. The values can be set by pressing the up- and down-button. The first value is the year followed by the month, the day and the abbreviation of the weekday. After having adjusted the month, the display for the day jumps to 1.

After having set all values, leave the menu by pressing the print-button (MPM-HV2). All values will be stored now.
The instrument is equipped with a battery and date and time will be updated (for approx. 1 year) even in off mode.

Calibration parameters as well as language are stored in EEPROM and will remain stored for a longer period.

Warranty:

Paul Marienfeld GmbH & Co. KG provides a guarantee for a period of 24 months from date of delivery for the instrument purchased by you. This warranty applies only to defects in material or workmanship. There is no warranty for defects or malfunctions caused by neglect, improper use or improper service.

In case of defects in material or workmanship, the instrument will be repaired or replaced. In case of replacement, the warranty for the new unit will persist for the remaining period of the primary warranty period. Charges for returning the instrument have to be borne by the customer.

Any claims regarding guarantee and liability are limited to professional and proper use of the instrument and observance of the general safety instructions and this instruction manual.

Liability exclusion:

Paul Marienfeld GmbH & Co. KG is not liable for any material or personal damages caused by improper use and does not accept liability for consequential damages.

Damaged and/or waste electric or electronic equipment has to be disposed of at the designated recycling depot.

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